Reclamation

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United States Department of the Interior
James G. Watt, Secretary

Bureau of Reclamation
Robert N. Broadbent
Commissioner

The Bureau of Reclamation of the U.S. Department of the Interior is responsible for the development and conservation of the Nation's water resources in the western United States.

The Bureau's original purpose "to provide for the reclamation of arid and semiarid lands in the West" today covers a wide range of interrelated functions. These include providing municipal and industrial water supplies; hydroelectric power generation; irrigation water for agriculture; water quality improvement; flood control; river regulation and control; fish and wildlife enhancement; outdoor recreation; and research in atmospheric water management and alternative energy sources, such as wind and solar power. The Bureau of Reclamation is also a primary source of research in the design, construction and development of materials used in water management structures. Bureau programs most frequently are the result of close cooperation with the U.S. Congress, other Federal agencies, States, local governments, academic institutions, water-user organizations and other concerned groups.

Acreage Limitation: Reclamation Reform

by Cassandra Larkins and Mitchell Snow

Cassandra Larkins

Mitchell Snow

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Recent photography by J.C. Dahilig, regional photographer, Mid-Pacific Region,Sacramento, California. Photographers of early Reclamation photographs are unknown.

Photos by Charles U. Carter

While the horse-drawn harvesters of 1902 have long since vanished, the Reclamation Act of that year remains to this day.

The legislation was designed to encourage settlement of the West by supplying irrigation water to settlers and homesteaders. But times have changed. In 1906, Reclamation water was available to 39,000 irrigable acres. By 1982, the number of acres served leaped to more than 12 million.

During the past 80 years, advances in agricultural technology and resource development in the western United States have created new challenges and considerations. Now, the 1902 Act is being updated by Congress to reflect today's technology and to meet current needs.

History of Legislation

The provisions of the Reclamation Act of 1902 have historical basis in the Homestead Act of 1862. The 160-acre limit on the amount of land a farmer could own under the Reclamation Act was a reflection of the same limit established by the Homestead Act four decades earlier. Residency requirements were also similar.

In the early days of Reclamation,the 1902 Act was strictly enforced. As problems mounted, administrative changes and legal interpretations of the legislation gradually diluted enforcement of the provisions.

The first major change came in 1910 when the term "neighborhood of the land" in the residency provision was interpreted to mean living within 50 miles of the property receiving Reclamation water. In 1916 married couples were allowed to request water for irrigation of up to 320 acres, and corporations were allowed to own farms irrigated by Reclamation water.

To discourage abuses that some of the changes had created, Congress passed the 1926 Omnibus Adjustment Act, requiring the Secretary of the Interior to contract with water and irrigation districts rather than individuals as specified under the 1902 Act. Excess land owners were faced with a law which denied them Reclamation water unless they agreed to sell their excess land to eligible owners at a price determined by the Secretary. The 1926 Act did not mention the residency requirement and, in the following years, residency was not mandatory. However, the 1926 Act did stipulate that contracts with water and irrigation districts must contain a 160-acre limitation provision. During this period, the Bureau of Reclamation placed greater responsibility on the districts to enforce the acreage limitation.

Although the impact of the 1926 Omnibus Act was significant, some irrigation and water districts and special interest groups from the 17 Western States continued to petition the U.S. Congress for exemptions from the acreage limitation

"Desert Ranch," an undeveloped farm owned by H.J. Mersdorf in Cladwell, Idaho, is an example of the family farm concept supported by the Bureau of Reclamation, 1940.

laws based on unfavorable conditions which affected their particular areas.

The extensive Westlands Water District of California's San Joaquin Valley, part of the Central Valley Project, eventually became the focus of the growing unrest. Many of the farms already in existence in Westlands when the area began receiving Reclamation irrigation water in 1967 were much larger than the acreage limitation provisions allowed. Although Westlands' excess land was being sold as required by legislation, critics charged that most of the sales were to relatives of the original owners and business partners of the corporations, and alleged that for all intents and purposes many of the large farming operations in the Valley continued intact.

The problem came to a head in 1976 when National Land For People, Inc., a public interest group of environmentalists and small farmers, filed suit against the procedures used by the agency in selling excess land. Those procedures often were established on a case-by-case basis. A Federal Court order resulted, directing Reclamation to publish guidelines to be used for the sale of excess lands. In 1977 the Department of the Interior published the proposed standards and regulations enforcing the acreage limitation provisions of the 1902 Reclamation Act.

Westlands Water District and others responded with another suit, which ended in a court order in December 1977 directing the Department of the Interior and the Bureau of Reclamation to prepare an Environmental Impact Statement (EIS) on the proposed rules. This effectively blocked any action on Interior's proposed guidelines and procedures until the EIS was completed. The draft EIS on the proposed rules was released by Interior in January of 1981.

Ten public hearings on Reclamation's draft EIS and the proposed regulations were scheduled in cities throughout the 17 Western States and in Washington, D.C., beginning

A farmer from the Uncompahgre Valley near Montrose, Colorado, displayed produce grown with Reclamation irrigation water from the Gunnison Tunnel at a county fair (date unknown).

in February of 1982. However, the House of Representatives began to take action on Reclamation reform, which led to a postponement of the hearings. Commissioner of Reclamation Robert N. Broadbent explained that "the Administration would prefer to implement new regulations based on a new law, but time is running out. The extended comment period on the pending rules drawn up under the old law expired December 31, 1981, then was extended again so hearings

Construction of a canal in California, 1906.

A cabbage harvest on the B.E. Smith Ranch, located on the Minidoka Project, 1909.

could be held. We postponed the hearings, hoping that Congress will move ahead and amend the law. If Congress does not act, we will have to promulgate rules that most interested parties won't like."

Commissioner Broadbent says he is optimistic that the proposed Reclamation reform bill will be workable, fair, and not loaded down with burdensome regulatory and bureaucratic provisions.

A load of crops from the Klamath Fair, October 1907.

Recent Developments

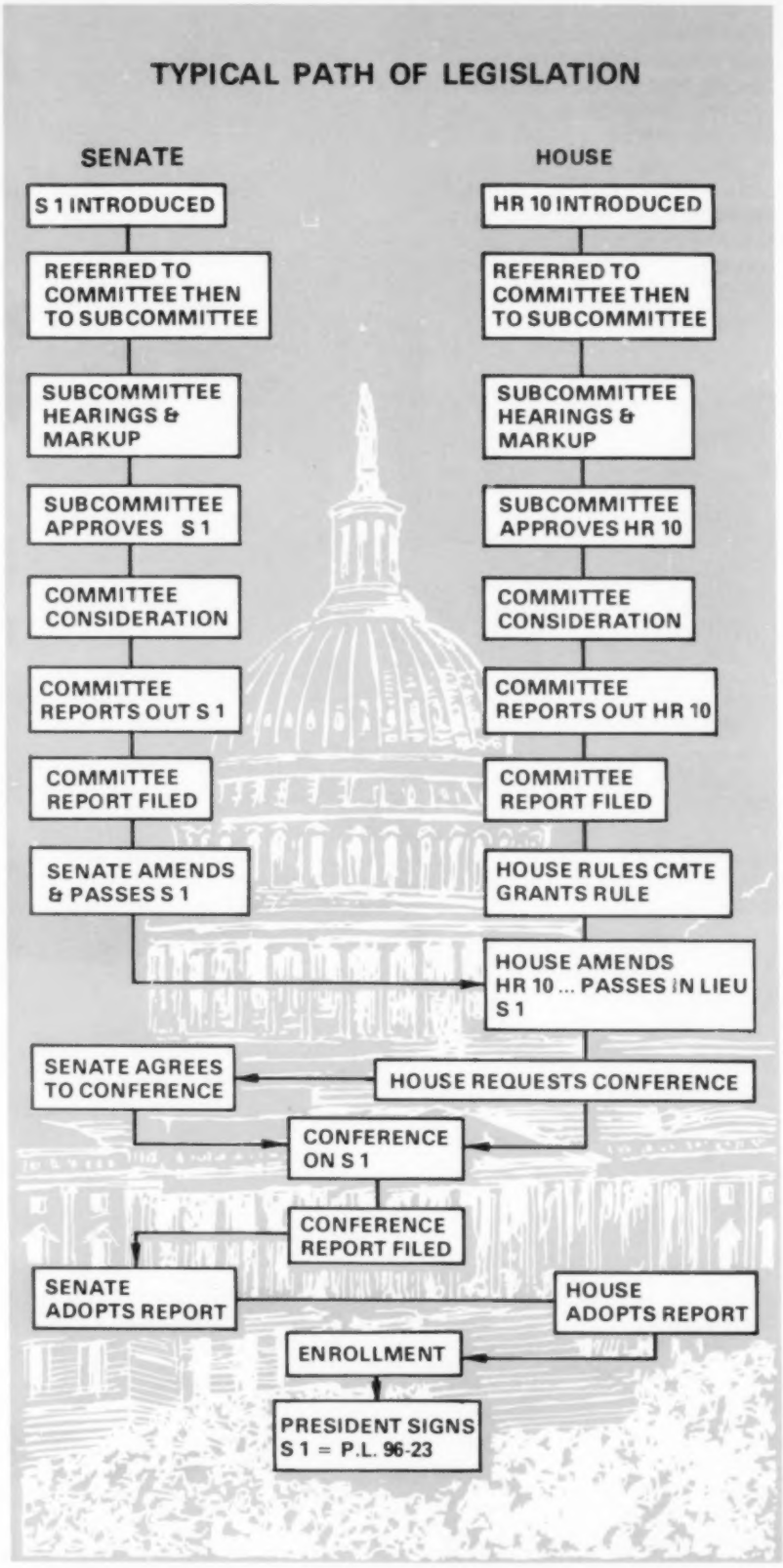
Congressman Manuel Lujan of New Mexico introduced the original draft legislation (H.R. 4265) that is the basis of the Reclamation reform bill, H.R. 5539, which passed the House by a vote of 228-117 on May 6, 1982, and was placed on the Senate calendar for consideration on May 12.

Major provisions of H.R. 5539 include:
–an increase in the amount of acreage from 160 acres to 960 acres an individual can own and irrigate with Federally subsidized water.

–"full cost" payment for water delivered to lands in excess of 960 acres. The bill defines " full cost" as the annual rate used to amortize the construction costs of a project allocated to irrigation, with interest at rates to be determined by the Secretary of the Treasury based on the rate for all bonds sold during the fiscal year in which project expenditures were made, not to fall below a minimum of 5 percent.
–water delivered to corporations which benefit more than 18 people will be at full cost, if the corporation has not received project water in the past. Corporations which have received project water before October of 1981 will pay full cost for water delivered to all lands in excess of 160 acres.

Senator James McClure of Idaho also introduced a bill in the Senate advocating reform in Reclamation law in November of 1981. The bill, S. 1867, was reported out of the Senate Committee on Energy and Natural Resouces on April 29, 1982, and is currently awaiting action on the floor of the Senate.

Major provisions of S. 1867 include:
–subsidized water for farms of up to 2080 acres, provided that not more than 1280 acres are owned by the farmer.
–water will be delivered to "limited recipients," defined as legal entities which benefit more than 25 people. Limited recipients can own no more than 640 acres, but the combined ownership/leasing ceiling is maintained at 2080 acres.



—"full cost" repayment for water delivered to lands in excess of 1280 acres if more than 2080 acres are in the farm operation. Limited recipients are required to pay full cost for water delivered to all lands above 640 acres if they request water for lands in excess of 2080 acres. The bill defines " full cost" as the annual rate used to amortize the construction costs allocated to irrigation, with interest rates to be based on the average interest rates on 15-year Treasury bonds. No minimum interest rate was set.

Secretary of the Interior James G. Watt indicated his approval of Congressional efforts to provide a solution for the problems affecting western water at hearings before the Congress in December of 1981.The Administration agrees with many of the provisions of both the House and Senate bills, including the repeal of the residency requirement, exemption of Corps of Engineers' projects from Reclamation law, and exemptions from acreage limitations for districts which have repaid their project construction costs to the Treasury.

Strawberries are hand-picked on a large farm a few miles southwest of Fresno, California.

Secretary Watt did offer suggestions for inclusion in the legislation. The Secretary recommended that rather than provide options on acreage limitations, a single 960-acre ownership limit for delivery of Federally subsidized water should be created. Full-cost payment would be mandatory for all water for excess lands. "While we support the concept of unlimited leasing, we believe that at some point a landholding can be too large to fit within the traditional family farm concept," he said.

Cantaloupes being harvested in the San Joaquin Valley.

A tomato field being irrigated a few miles south of Los Banos, California.

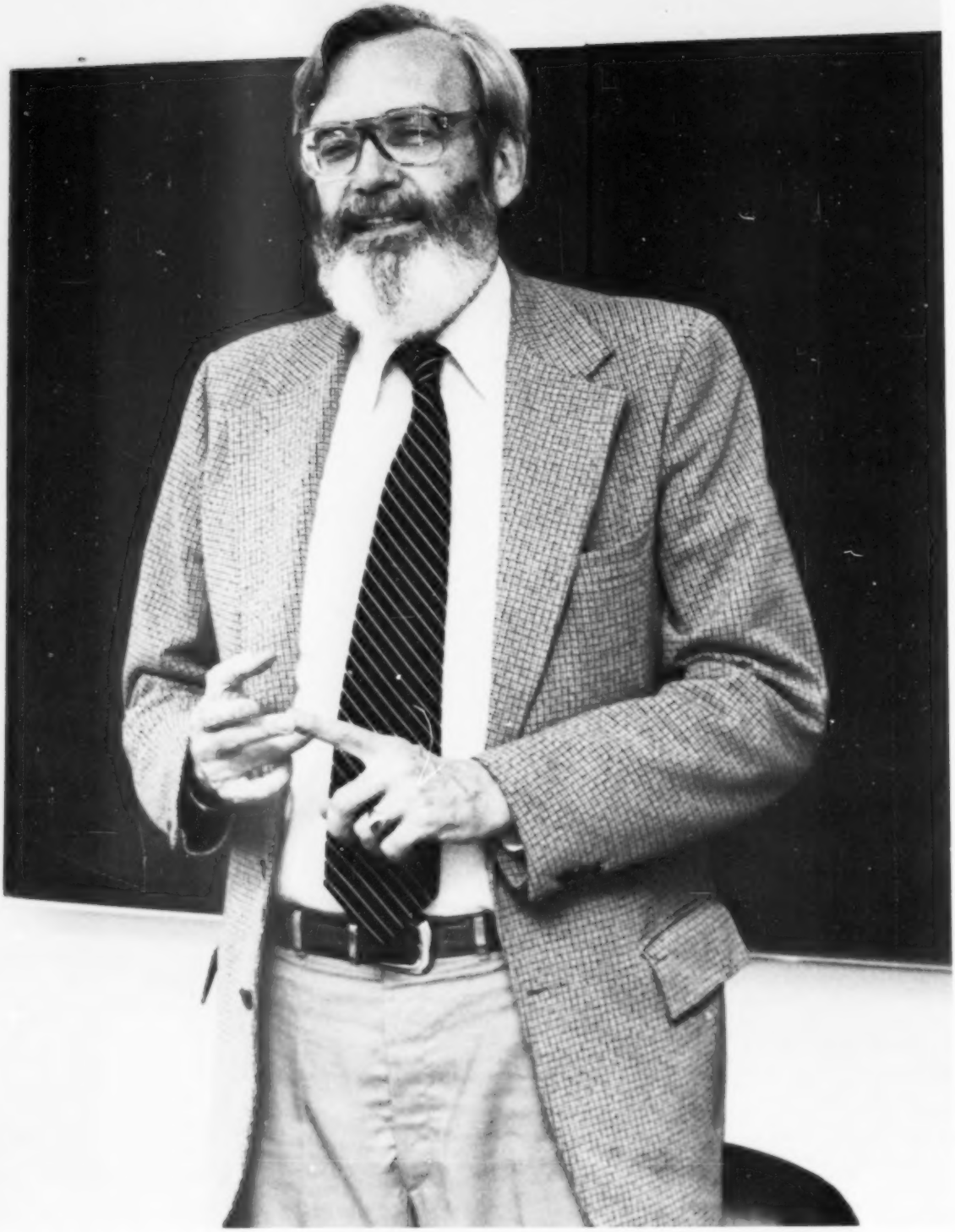
"Full cost payment, as advocated by the Secretary," Commissioner Broadbent explained, "means just that . . . instead of calculating interest at the rate that was in effect when a project was built, we believe it should be calculated at what it is actually costing the Treasury today. The full cost rate only applies to the larger farms and only to that part of their operations over 960 acres. The overwhelming majority of farms, therefore, would not be affected.

Mechanized farming: harvesting peas near Los Banos, California.

"Reclamation law was never intended to reward smallness for its own sake, nor to penalize farmers for operating successfully enough to expand their irrigated acreage," Broadbent added.

"Congress should be able to form a consensus and pass a Reclamation reform bill based on the proposals presented," the Commissioner continued. "President Reagan will be able to sign a bill like that, and we in the Bureau of Reclamation will be able to bring a troubling and complicated chapter of Reclamation history to a successful conclusion."

A "traveling packing shed" enables workers on a large farm near Firebaugh, California, to pick, clean, sort and pack Crenshaw melons in the field for immediate shipment to consumers throughout the United States.



From the Bureau of Reclamation to the Central Planning Council: A Fifty-Year Retrospective

by Joseph F. Coates

About The Author

Joseph F. Coates, president of J.F. Coates, Inc., is a prominent futurist and a technology assessment expert. He has provided training for the Bureau of Reclamation's Office of Policy and Management on the agency's "Futures" effort. Coates and Reclamation management personnel are developing possible future scenarios to assist the Commissioner and the Permanent Management Committee in long-range planning and goal-setting.

Coates has been responsible for the technology assessment program at the National Science Foundation. Prior to establishing his consulting firm, he was a Senior Associate for the Office of Technology and Assessment, a prestigious study group for the U.S. Congress.

He holds a B.S. in Chemistry from the Polytechnic Institute of Brooklyn and an M.S. in Organic Chemistry from Pennsylvania State University. Coates has also done graduate study in philosophy at the University of Pennsylvania.

Photography by John Norquist, Engineering and Research Center, Denver, Colorado, and Charles U. Carter, Reclamation's Office of Public Affairs, Washington, D.C.

It is a great pleasure for me to have the opportunity to address the Central Planning Council of the Air and Water Administration at this critical juncture in the Nation's and in the Administration's history. Tomorrow the national plebiscite will determine whether our 56 States will be reorganized into nine provinces. Since the telesurveys make the 43rd Constitutional Amendment implementing this reorganization increasingly likely, we must begin to think even more sharply about the implications for the AWA. Historical context should inform our thinking. I will devote the next few minutes, therefore, to recalling critical events in the past 50 years of our history. Understanding those events may lead to more effective planning, whether or not the Constitutional reorganization occurs.

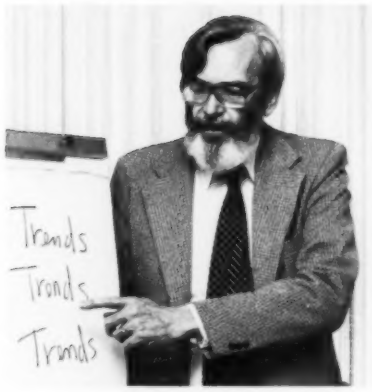
Only last year, in 2031, our population exceeded 350 million, which would certainly confound the forecasters of '81. We have, of course, added the three former provinces of Canada, Puerto Rico and the United Kingdom as states.

Tomorrow's momentous event is a consequence of the 39th Amendment of 2020, permitting Constitutional amendments by plebiscite after a minimum of nine and a maximum of 18 months of national telemated discussion.

A landmark event for the AWA occurred in 2018 when 18 billion nudies were voted for aquifer repair in the western zone. Incidentally, some of you younger members of the Council may not recall the origin of nudies. Earlier currency was known as dollars. It was called in as a result of uncontrolled inflation, and new money reissued in '93 became known as "new dollars" or "new D's."

The Aquifer Reconstruction Act, of course, followed by only one year the formation of the Air and Water Administration in 2016, but the move toward continental and planetary engineering had been well underway by that time. In 2013 the National Commission on the Interpretation of the Carbonification of the Atmosphere recommended a dual strategy of removals and revetments which, of course, had been more informally underway. Now with congressional backing, a national authority, plans are moving apace. It is a bit surprising that the Commission came out four square for dual strategy in view of the fact it was only in 2011 that the thousand-mile Houston revetment was overwashed by Hurricane Montezuma. What a goof they discovered — there was no capability for pumping the water out. Houston remained flooded for 16 days with some places under 24 feet of water. Breaching the dike was itself quite an excitement.

The trouble came in bunches, of course. The year 2012 was the third consecutive year of the Lake Mead drawdown as a result of increased seismic activity. As the fates would have it, this came coincidentally with the fifth year of drought on what by then had come to be known as the Stephens cycle.



In 2012 the commissioner of our antecedent organization, the Bureau of Reclamation, was indicted along with General Goodhand under the Public Officials Negligence Act of 2003. While it has a big public relations element, it was necessary to deal with the public outcry against the failure to cope with the aquifer contamination and depletion problem which had been unequivocally defined by the old National Academy study in '92. Those old geezers had it right. It was a pity that they couldn't make their story stick. They might have if they had diagovision on the public policy channels.

You may recall that the old Corps of Engineers, which was principally responsible for the eastern and coastal zone regions, was civilianized in 2008. But they kept on much of the senior force through the next decade.

Neither of our antecedents' organizations showed up very well in the nuclear cleanup at Phoenix in 2006. It took us completely by surprise in spite of the Indus Valley episode in the Brazil-Argentine fiasco. Even now you can buy Phoenix real estate at 10¢ on the nudie. Perhaps the darkest and most troubled period in the Bureau's late history was when President Cleveland Rodriguez closed the Mexican border creating the largest security civil work in the Western Hemisphere. It took five years to set up the electronic fence. Remember Rodriquez' rousing call, "They are Mexicans, we are Americans, and we have enough of each."

The first major success in planetary engineering in the new style began in 1996 when, forced by the Mexican oil-water crisis, we committed ourselves to Project Iceberg. The first iceberg was delivered to Baja California in 2003, and new ones have been delivered on schedule every four years since then. Of course, they now go to seven other locations around the globe. I recall tremendous problems in learning how to melt them down. Remember the hurlyburly when the microclimate changes began to radically effect the biota on the peninsula.

On July 4, 1994, the San Francisco quake at Richter 6.3 followed by more quakes in the next three months with a peak of 8.1 took 9300 lives and created 87,000 hospitalized casualties. It was that event which perhaps more than any other, revolutionized land planning in the United States and gave the great impetus to what is now the Air and Water Administration.

In 1989, an early step toward the present administration was the formation of the International Civil Engineering Laboratory jointly sponsored by the old Bureau, the old Corps, and the Department of Global Affairs (established in 1987).

Court actions have declined substantially since the Mediation and Arbitration Act of 2001. But recall the great trouble when in '94, the federated Indians of the Central Plains took the Bureau to the World Court. It was the biggest Wild West show in Europe since Buffalo Bill hit Paris.

Perhaps the most difficult mission the old Bureau undertook was in '93 when because of the failure of private sector managers to effectively cope with open pits and the discovery that they were increasingly polluting aquifers, the Bureau was assigned responsibility for their management.

Again, trouble comes in bunches. It was only a year later that the most resisted land reform bill in North America was first put forward by Senator Jones. His proposal to nationalize the aquifers and all forms of underground water supplies took 13 years to pass into legislation.

Recall in 1992, President Levy was elected after a great success as Governor of Iowa in the first fully telemated public discussion of major legislation. She managed to have twenty million old dollars voted for a two-year period for a state-wide public participatory activity by what was then called cable. That was such a smashing success that it not only stimulated the wiring of the Nation but swept her into office in '92, as the first candidate of the United Reform Party.

The year 1986 was an interesting one for the civil service. It was the year the first BEBE was awarded for distinguished civil service. This was only four years after it was initiated as an internal agency award by Commissioner Robert N. Broadbent in the old Bureau. The initial reward was equivalent to 64,000 nudies. The exciting feature of it was that it was a totally untaxable and unrestricted resource at the disposal of the individual, but was not convertible into personal assets.

I never remember old political history and, unfortunately, my notes are a little smudged about who won the election in '84. I believe that the long-term lesson out of this one brief line of our organizational history is that after much backing and filling, many false starts and incredible resistance, we've managed to achieve a felicitous balance between necessary centralized planning on a national and, in many regards, on global scale, coupled with full in-depth participation by all citizens and all affected parties. Let's hope under the province system we will be able to affect a transition, to continue and expand this proven concept of decentralized-centralized planning.

Afterword

The above is only one of the potential future histories of the Bureau. Much of what is there is plausible, perhaps none of it is likely. The real problem faced by planners today is not to select a favorite future, this or any other, but to identify the factors and forces which will define all alternate futures. In this way we will be able to come to grips with the future through effective present action. If we do not wrestle with the future positively, i.e. in a way consonant with long-term trends and long-term needs, the future will control us rather than allowing us to control the future.

Fontenelle Res.
GREAT SALT LAKE
Flaming Gorge Res.
DUTCH JOHN
BROWNS PARK
SALT LAKE CITY
River
Provo
Deer Creek Res.
VERNAL
Utah Lake
PROVO
BONANZA
White River
RIVER
PRICE
GREEN
Sevier Bridge Res.
DELTA
GREEN RIVER
Sevier River
LABYRINTH CANYON
Colorado River
MOAB
UTAH
More difficult run
Easier run
Lake Powell
San Juan River
BLUFF
MEXICAN HAT

Canoeing On The Upper Colorado: An Old Way to Travel, A Popular New Sport

by Roger D. Hansen and Roland Luxenberg

Millions of tourists visit the West each year to view scenic canyon wonders and to sample America's earlier days. But, as impressive as these canyons are from the rim, they are even more awesome to the canoeist from river level.

Major John Wesley Powell wrote in his journal during his historic mapping trip of the Colorado, a description of a day on the quiet waters of Labyrinth Canyon on the Green River: " There is an exquisite charm in our ride today down this beautiful canyon. It gradually grows deeper with every mile of travel; the walls are symmetrically curved and grandly arched, of a beautiful color, and reflected in the quiet waters in many places so as almost to deceive the eye and suggest to the beholder the thought that he is looking into profound depths."

Western rivers exude history. Indian ruins can be found by the observant. Centuries ago, the Anasazi were driven out of the drainages of the Upper Colorado by drought, but they left behind the remains of mortared houses and grainaries, as well as cryptic images chiseled in rock.

The first evidence of European civilization in the canyonlands of the Upper Colorado was left by the French trapper, Denis Julien. In 1836, thirty-three years before Powell's first mapping expedition, he traveled the Colorado and Green Rivers, leaving his name and the dates of his visits carved into the rock walls of several canyons.

From left to right: Roland Luxenberg, Tom Fridmann, Roger Hansen, Floyd Barnes.

Roger D. Hansen and Roland Luxenberg are both engineers in Reclamation's Utah Projects Office, Provo, Utah.

Map by Floyd Barnes, Utah Projects Office. Photography by Tom Fridmann, photographer, Upper Colorado Region, Salt Lake City, Utah; Roger D. Hansen and Roland Luxenberg, Utah Projects Office, Provo, Utah.

Whether you are a white-water specialist or a flat-water novice, there is a stretch of river in the Upper Colorado River drainage area to match your interests and abilities.

The San Juan River below Navajo Dam in Arizona provides not only intermediate white-water canoeing, but colorful, majestic side canyons for exploring as well. Of particular note are Slickhorn Gulch, Grand Gulch and Steer Gulch. As you climb into the Slickhorn Gulch drainage, there is a series of clear, spring-fed pools. After a hot, tiring day of canoeing on the San Juan, a dip in one of these small pools is an ideal form of relaxation. The Green River below Flaming Gorge Dam in Utah has several miles of white water before flattening out in the historic Browns Park area.

The Green River below Flaming Gorge Dam is a favorite area to float for canoeists and rafters.

When the canoeist enters Browns Park on the Green River below Flaming Gorge Dam, he enters the past refuge of Old West outlaws. Half in Utah, half in Colorado, close to Wyoming, Browns Park became a handy hideout for outlaws on the run. Butch Cassidy's gang dynamited railroad cars, robbed banks, and craftily evaded lawmen by ducking in and out of Browns Park between "jobs." One of the most colorful outlaws was ex-slave Isom Dart. He was reported to be an expert with a rope, branding iron and pistol. He used these "skills" to rustle cattle and horses. In 1900 he was shot by hired-gun Tom Horn. This shooting was the beginning of an exodus of outlaws from the area.

Browns Park today is a national wildlife refuge. The number of migratory waterfowl resting in the Browns Park area, dependent on annual flooding of the Green River, declined for a short time after Flaming Gorge Dam was completed. However, the dam is now operated so that the area refloods drained nesting areas and the migratory birds have returned.

A canoe is, as it has always been, one of the best methods for observing wildlife. An alert canoeist can watch a coyote poach watermelon on an isolated farm on the Green River . . . chuckers scurry along side canyons of the San Juan . . . blue herons fish in the shallow, muddy waters of the Colorado.

But the rivers of the Upper Colorado are best known for their white water. A canoeist, when choosing a river, must match skill with the difficulty of the river. To quote from Wallace Stegner's *Beyond the Hundredth Meridian:* ". . . what every man who has ever handled a boat on the Green or Colorado or San Juan learns: how a trivial mistake can lead to trouble. The rivers are not treacherous. They are only forever dangerous. One who has not tried it finds it hard to believe the instant and terrible force that such a current exerts on a broadside boat out of control on a sandbar or rock."

Canoeing is rapidly becoming a popular sport, and the western states provide excellent locations for all levels of proficiency. The following is a quick reference to the rivers of the Upper Colorado Basin.

The Green River

The Green River, from Flaming Gorge Dam in Utah to the Gates of Lodore 46 miles downstream, offers a beautiful river trip through Red Canyon and Browns Park. The section through Red Canyon contains frequent rapids and is heavily used by rafters as well as canoeists. This portion of the river is not recommended for those seeking a wilderness experience. It is scenic and a good place to practice white-water skills. Take-out is at Little Hole Campground, about seven miles below Flaming Gorge. If the run is extended to the Taylor Flat Bridge, Red Creek Rapid may need to be portaged.

The section through Browns Park is fairly flat and open. It receives little use because there are only a few small rapids. The thirty miles takes an average of two days. Take-out is at the Lodore Ranger Station.

Below the town of Green River, Utah, the river is wide and slow, and often takes on the character of a lake. Veteran river-runner Vern Huser calls this area "one of the finest I have ever floated. It is calm and peaceful, a scenic wonder without parallel." During holidays, however, the area is used heavily by motorized boats.

Farther downriver is Labyrinth Canyon. It is an isolated area and logistics must be worked out carefully. The best time to canoe this stretch is in the spring through to the fall. Put-in is usually at Green River State Park or at Ruby Ranch (25 river miles below the town of Green River). Take-out is at Mineral Bottom. However, if you choose to continue beyond Mineral Bottom through Stillwater Canyon to the confluence of the Green and Colorado Rivers, pick-up must be by jetboat.

During October we canoed from Ruby Ranch to Mineral Bottom, a distance of 45 miles. During the three-day trip, we had plenty of time to explore side canyons. Major John Wesley Powell was particularly impressed with Trin-Alcove, and so were we. At one point, Bow Knot Bend, the Green River flows seven miles only to double back to within one-half mile of itself. A local outfitter in Green River, Utah, drove our car to Mineral Bottom, where we left the river.

Canoeists and rafters prepare for the short float from Flaming Gorge Dam to Little Hole Campground.

The San Juan River

The Navajo Reservoir is on the San Juan River above Farmington, New Mexico. It supplies agricultural water to thousands of acres of Indian lands in the Four Corners area (where Utah, Colorado, New Mexico and Arizona meet). The San Juan's flow through southeastern Utah is regulated by reservoir releases, thus evening out the river's flow.

The San Juan's turbid waters are ideal for the intermediate canoeist. The 150-mile stretch of the San Juan from Four Corners to Lake Powell can be canoed. The water is flat, broad and slow. This area is rich in history . . . old trading posts and Indian ruins.

Below Bluff, the river enters a series of impressive canyons, including the Goosenecks. However, once a canoeist passes Mexican Hat, there is no place to take-out until reaching Lake Powell, 56 miles downstream.

The lower stretch of the San Juan has frequent and exciting rapids. It also has a unique phenomenon known as "sand waves." Sand waves are the result of supersaturation of water with silt, setting up waves in shallow water that build in a regular "haystack" pattern. The waves are very noisy and can be frightening on a first encounter.

Sand waves, because of their size and regularity, make for an exciting ride. All rapids on the San Juan are short and can be portaged. As exciting as the rapids are, the side canyons are the most memorable. A Bluff outfitter picked us up at Clay Hills Crossing on Lake Powell.

The Colorado River

Until 1921, the Colorado River above its confluence with the Green River was known as the Grand River. This section of the river flows about 145 miles through Utah before entering Lake Powell at the Utah-Arizona border. It is floatable

The Sevier River is a smaller stream that provides excellent canoeing in central Utah.

Rafters float the Green River below Flaming Gorge Dam.

and ideal for canoeing, except for a 12-mile segment near Cisco, Utah (Westwater Canyon) and a 10-mile stretch through Professor Valley north of Moab and Cataract Canyon, just above Lake Powell.

The area boasts some of the most scenic terrain on the river. Going south from Moab, take-out is at the end of state route U-279 below Potash or, if you have a four-wheel drive vehicle, at the mouth of Lathrop Canyon. If you continue to the confluence of the Green and Colorado Rivers, pick-up must be made by jetboat. This area has some Indian ruins, natural arches, good birding and an impressive canyon to explore.

Other Upper Colorado and Great Basin Rivers

Surprisingly, some of the best canoeing in the West is on small, meandering streams. These streams are normally too shallow for motorized boats, too slow for white-water rafters, and too inaccessible for most recreationists.

One of these small waterways is the Sevier River, about 10 miles below Mills, Utah. The run only had three small riffles and required maneuvering through railroad bridges, but was very enjoyable. Canadian geese were everywhere and the hilly, desert locale was an interesting change in scenery.

The White River, which flows through Utah's oil shale country, is swift and provides a good canoe ride. The Provo River below Deer Creek Reservoir and above Olmsted Diversion Dam is a good area to practice river-running skills. Many other small rivers and streams in the intermountain West provide canoe runs, including stretches of the upper Green, Bear, Weber, Jordan, Dolores and Yampa.

The attractiveness of canoeing in the West was summed up in a 1977 National Geographic Society publication entitled, ***Still Water, White Water.*** A river guide was asked why Utah rivers are such an attraction. He answered, "These rivers provide every emotion . . . exhilaration, terror, supreme peace. After you've spent some time on them, the wondrous becomes commonplace, and the commonplace becomes wondrous."

Evening canoeing in Labyrinth Canyon on the Green River.

Caveat

Because of the isolated nature of many of the Upper Colorado canoeing runs, logistics must be carefully worked out. Some points to remember are:
–most areas necessitate carrying your own water--one gallon per person per day.
–some areas, like the San Juan River, require a permit.
–obtain and use topographic maps of the area--U.S. Geological Survey has excellent maps.

Canoeists on the Provo River maneuver under an old railroad bridge.

–study the area to be navigated.
–always prepare for the unexpected.
–hypothermia can and does kill . . . learn how to avoid it, recognize its symptoms, and deal with it.

Before launching your canoe, it is important to learn something about the sport. If possible, plan to canoe with someone who knows the sport. Practice and gain experience on quiet water under "ideal" conditions.

Study material on the sport and the area you plan to canoe. Talk to outfitters.

ALWAYS wear a life preserver . . . windy lakes and fast-moving water can be "forever dangerous."

Lunch stop on the White River in Utah's oil shale country.

Suggested Readings and References

Canyon Country Paddles, 1978. Huser, Verne, author; Wasatch Publishers, Inc., Salt Lake City, Utah.

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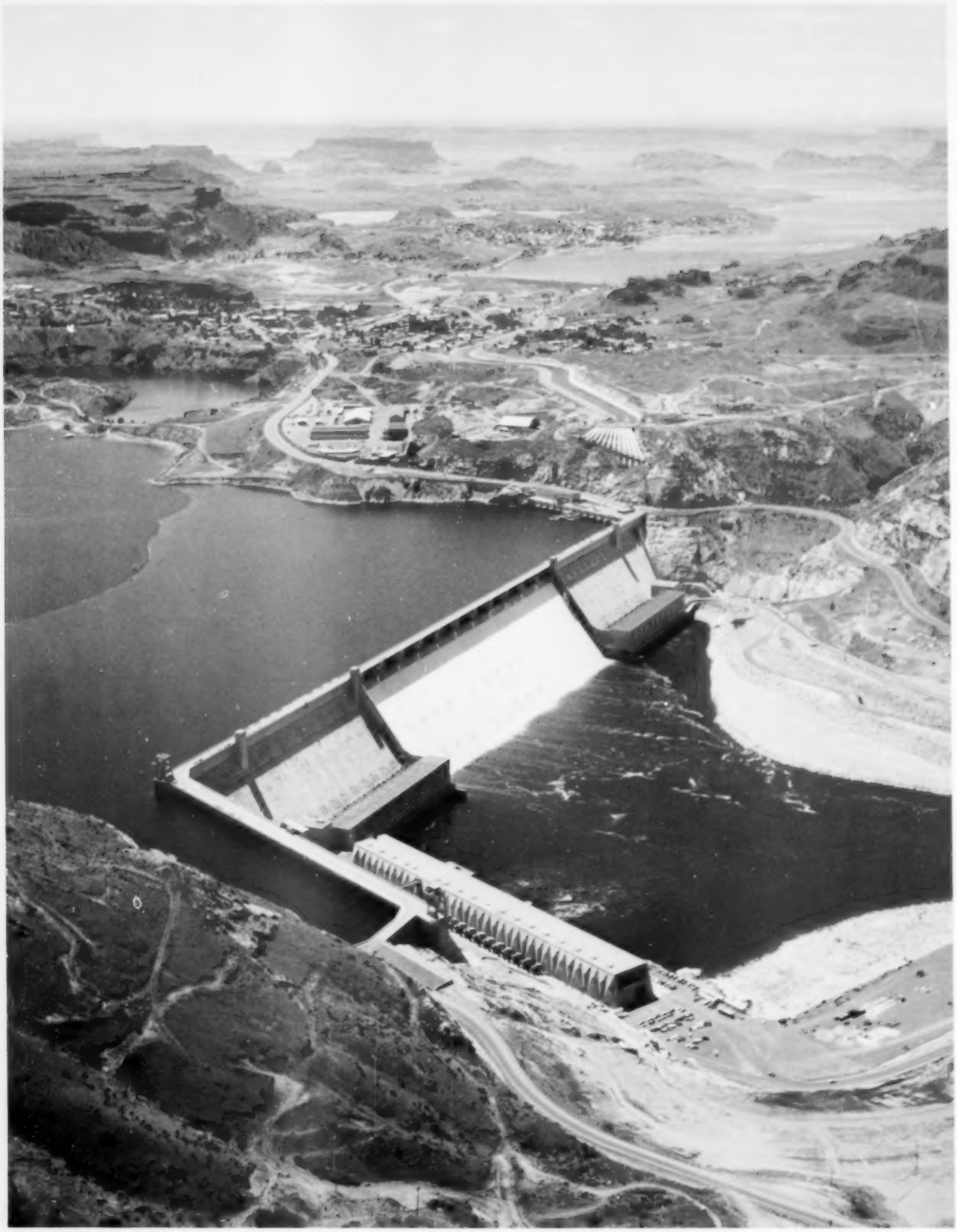
Geology of the Canyons of the San Juan River, 1973. Baars, D.L., editor; Four Corners Geological Society, Durango, Colorado.

The Exploration of the Colorado River and its Canyons, 1961 (first published in 1895). Powell, John Wesley, author; Dover Publications, New York, New York.

Beyond the Hundredth Meridian, 1953. Stegner, Wallace, author; Houghton Mifflin Company, Boston, Massachusetts.



Grand Coulee Dam is the keystone of Reclamation's Columbia Basin Project in Washington State.

Water and Life: Grand Coulee Dam Tour

by Stephen G. Wade

The large circular concrete and glass Visitor Arrival Center is the starting point for the Grand Coulee Dam/Third Powerplant tour.

Visitors have always seen Grand Coulee Dam as a marvel of engineering: massive amounts of concrete holding back the great force of the Columbia River; mighty turbines turning the world's largest hydrogenerators; enormous pumps filling Banks Lake, providing irrigation water for hundreds of thousands of acres of cropland on Reclamation's Columbia Basin Project. Grand Coulee Dam is the keystone of the Columbia Basin Project.

Grand Coulee Dam has always attracted large numbers of visitors. The original tour, which relied heavily on tour guides, was disrupted when construction began on the Third Powerplant in the late 1960s. Since that time until the spring of 1981, visitors to Grand Coulee Dam used "temporary" tour facilities.

Today, Grand Coulee Dam has new visitor facilities. The first thing you will notice as you arrive is the sign program. Distinctive blue and green theme colors set against black background with the new Grand Coulee logo greets the visitor at the outskirts of the city of Grand Coulee, two miles from the new Visitor Arrival Center. With the new exterior signs, there is no doubt that if you are looking for Grand Coulee Dam, you're on the right road.

The Visitor Arrival Center, the starting point for the tour, is a large circular concrete and glass structure. It was designed as part of the Third Powerplant construction package, along with visitor facilities in the Third Powerplant itself. In addition to a magnificent view of the Columbia River, Grand Coulee Dam and its powerplants, the Visitor Arrival Center provides the visitor with convenience and comfort facilities.

A giant theme mural, "Water and Life," was created by Mike Casad of Seattle, Washington. It is approximately 10 feet high by 65 feet long and hangs on a marquee over the reception desk. To prepare the visitor for the tour, a movie entitled "Columbia--Fountain of Life" is shown at regular intervals in a comfortable 150-seat theatre upstairs.

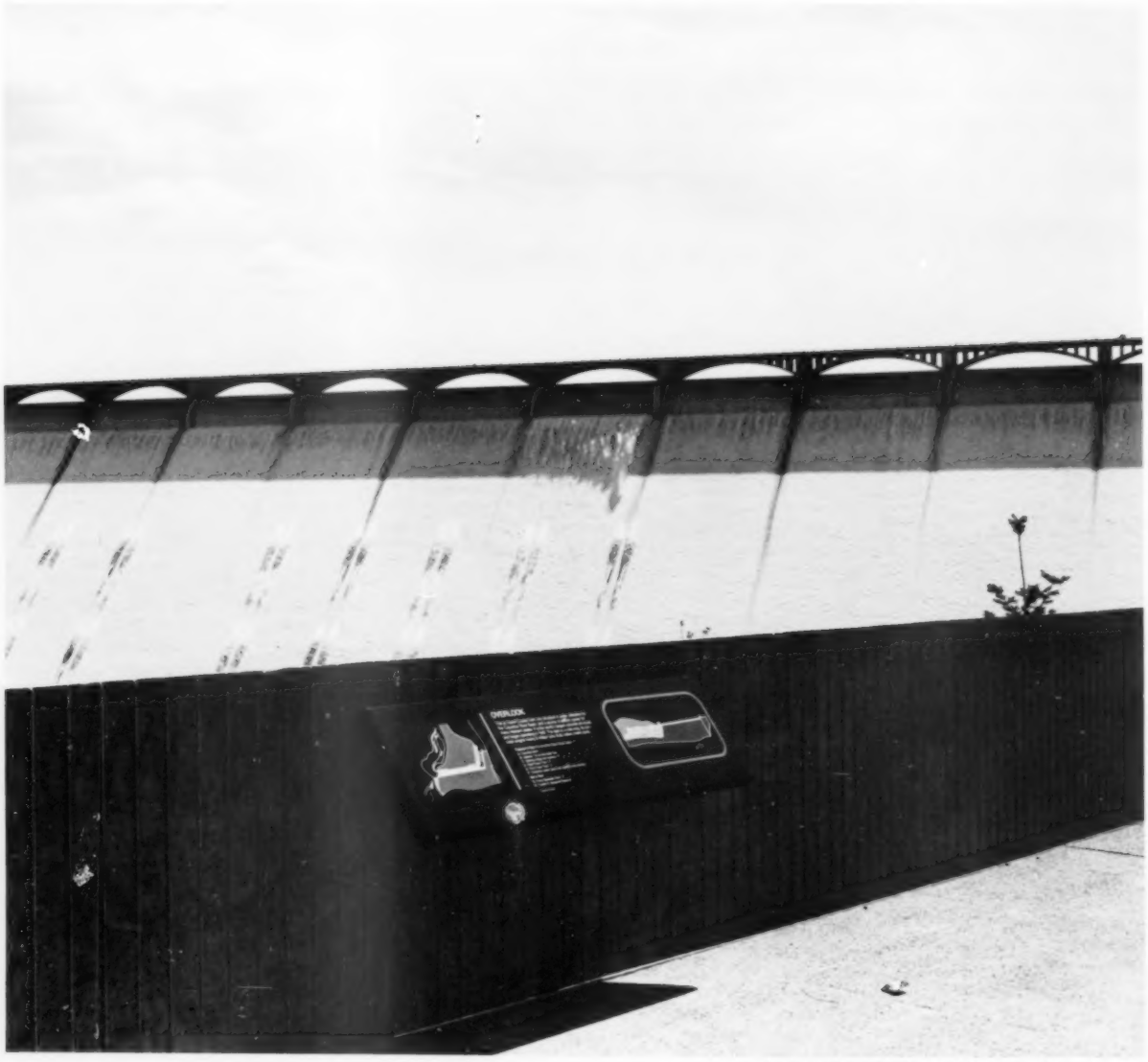
There is also an orientation map showing Columbia Basin Project facilities and a three-dimensional

A greeting to visitors in the Center is a giant theme mural, "Water and Life."

model of the dam. This model, along with an audio tape, gives the visitor a briefing about what will be seen at various stops on the tour.

Two minicomputers are the first of several "hands-on" opportunities in the exhibit. One provides information on a variety of water resource development subjects. The other gives information on recreational opportunities available, complete with a printout of campgrounds and other facilities within specified distances from the dam.

Tour stop 2 is the Pump-Generator Plant, about one-half mile from the Visitor Arrival Center.



A view of Grand Coulee's spillway from the overlook on tour stop 3. The view also includes a panoramic view of the river 350 feet below, the Right and Third Powerplants and the city of Coulee Dam.

Tour stop 2 is just over one-half mile away from the visitor center, in the Pump-Generator Plant at the left abutment of the dam. Currently, visitors provide their own transportation via automobile to reach the other tourist stops. Eventually, a visitor transportation system will provide round-trip service from the visitor center to the furthest point of the tour, stop 5, the Third Powerplant--a round-trip distance of three miles.

Stop 2 is in two levels. The upper level includes an animated display tracing irrigation water from Grand Coulee Dam south through the Columbia Basin Project. There is a diorama on the history of irrigation and flood control, and information on the area's geology and how Grand Coulee Dam affects the environment around it.

The lower level of the Pump-Generator Plant offers a view of the huge pumps which lift water from Lake Roosevelt into Banks Lake and into the Columbia Basin Project irrigation system.

Tour stop 3 is the spillway of Grand Coulee Dam. It offers a panoramic view of the river 350 feet below, the powerplants, the Visitor Arrival Center and the city of Coulee Dam downstream.

Tour stop 4 is the Right Powerplant, offering four levels. The first stop on the elevator ride down is a gallery or tunnel in the dam used during construction, which continues to be used for inspection and other pur-

Displays at tour stop 4 include an explanation of the nature of electricity.

Visitors watch the rotating shafts of the Right Powerplant's generating units, which are three feet in diameter.

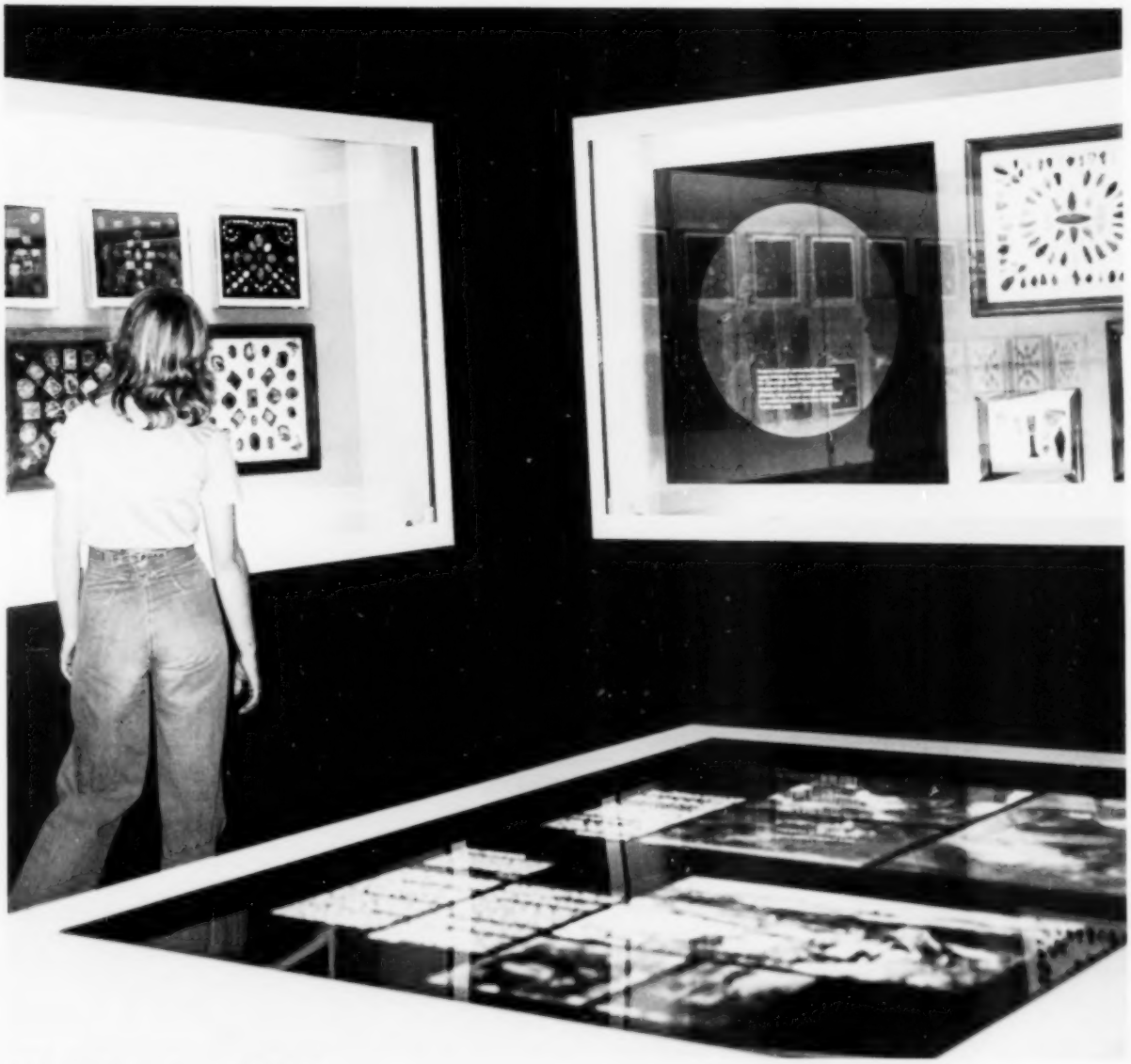
This large hydrologic cycle mural is painted on a wall near the generators in Right Powerplant.

poses. Continuing down, the next level is the main floor visitor area. Here is the agate/artifact room which tells the story of the area's early inhabitants and contains a beautiful agate collection donated by a former Reclamation employee at the dam.

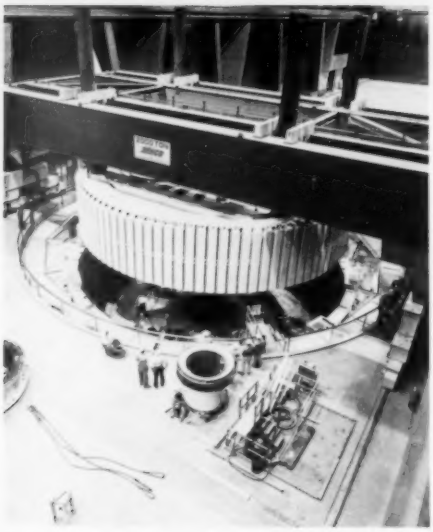
This level includes displays on the nature of electricity and, a short elevator ride away, a visitor can see the rotating shafts of the powerplant generating units. Visitors should take special note of the size of these shafts, which are three feet in diameter, and compare them with those to be seen later in the Third Powerplant, which are eight feet in diameter.

Control of the entire Grand Coulee Dam complex is explained at the third level. This includes, via video tape, a look at how the new Grand Coulee Dam Programmable Master Supervisory Control--the computer-based system which will eventually control all plant functions from one location--will work.

One of the special visitor features of the Third Powerplant, tour stop 5, is a glass-enclosed incline elevator which runs from atop the new forebay dam to the level below the main powerplant floor. At an intermediate stop, called the mid-station, visitors learn about the Third Powerplant's planning, architecture and construction.



Visitors learn about the area's early inhabitants and admire a beautiful agate collection on the tour stop in the Right Powerplant.



Workmen place one of the rotors during construction in the Third Powerplant. The rotor is 62 feet in diameter and weighs more than 1500 tons.

The incline elevator takes visitors from the top of the new forebay dam to a mid-level stop, then to the climax of the tour–a close-up view of two of the huge Third Powerplant generating units.

A crossover bridge leads to an interior viewing area high above the generator floor, where exhibits include a simplified Third Powerplant generator model. Walking through to an exterior balcony, the visitor has a tremendous view of the Columbia River and the downstream face of Grand Coulee Dam. Here a bald eagle sculpture, created by Paul Wegner of Linden, Virginia, honors our national symbol. Eagles can be seen flying near the dam from about December 1 through mid-March.

For the end of the tour, the visitor can reboard the incline elevator or walk down to the shaft area of the Third Powerplant. At this final stop, two of the huge eight-foot-diameter shafts which couple the generators to the turbines may be viewed. It is at this point that the visitor really becomes aware of the immensity of the Third Powerplant.

The visitor program is usually open year-round, except for Thanksgiving and Christmas. Summer hours--Memorial Day through Labor Day--are 8:30 a.m. to 10:00 p.m. During the summer a special spill/color lighting program is presented each day at dusk. Winter hours are usually 8:30 a.m. to 5:00 p.m. There is no charge to take the Grand Coulee Dam/Third Powerplant tour.

The view from the incline elevator on the way down to the Third Powerplant.

Grand Coulee Dam, the Visitor Arrival Center and the Third Powerplant during the special spill/color lighting program.

A sculpture of an eagle on the exterior balcony of the Third Powerplant honors America's national symbol.

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